

good instance of how what must seem a complicated mental choice—for the larvæ pupate readily enough amongst the evergreen *Skinimia* leaves—has arisen through natural selection.

By the bye, the time given for quiescent position of *P. machaon* after girth is spun (Tutt, *Nat. Hist. Brit. Lep.*, vol. viii., p. 77) is shorter by half a day at least, and by a whole day in most cases, from what I have observed taken even in warm weather.

Myrmecophilous Notes for 1908 (with plate).

By H. St. J. K. DONISTHORPE, F.Z.S., F.E.S.

(Concluded from, vol. xx., p. 284.)

CYNIPIDÆ.—*Rhoptromeris formicaria*, Kieff.—Professor Kieffer has given this name to an insect which I took in a nest of *Formica fusca*, in the New Forest, on June 6th, as it was new to science.

PROCTOTRUPIDÆ.—*Serphus gravidator*, L.—When digging up a nest of *Formica sanguinea* at Woking, on July 15th, to obtain the winged sexes, I found a specimen of this insect in the centre of the nest. I may mention that the male ants were much more abundant than the winged females.

Gonatopus myrmecophilus, Kieff.—Several specimens of this species, which is here recorded for the first time in Britain, were obtained in company with *Pezomachus anthracinus* (before mentioned), and *Lasius niger* on the sandhills at Deal, on June 21st.

Gonatopus distinctus, Kieff.—A specimen was swept up off bracken in the New Forest, in company with specimens of *Formica rufibarbis* var. *fusco-rufibarbis*, on June 8th. The colour of the *Gonatopus* agrees well with that of the ant. It appears to have only been found at Oxshott and Newquay in Britain, before. As I have pointed out before, the species of *Gonatopus* belong to the class of (myrmecophilous) insects, etc., which much resemble ants in appearance, hunt their prey in company with ants, or in the neighbourhood of ants' nests, and obtain protection from their resemblance to the ants, *i.e.*, my group iii., in the "Myrmecophilous spiders" (*The Zoologist*, 1908, p. 420).

Sovotropa subterranea, Kieff.—This little species in the *Diapriidae*, was also new to science, when I took it at Blackgang Chine on August 17th, last. It occurred with *Solenopsis fugax* and *Lasius flavus*, at the roots of *Arenaria maritima*.

I have again to thank Prof. Dr. T. T. Kieffer for his kindness in naming the above insects for me.

DIPTERA.—*Scatopse transversalis*, L.—I captured specimens in a nest of *Formica rufa*, in the Haye Woods, near Knowle, Warwickshire, in May. It will be remembered, that I have already bred a new variety of this species in numbers from my *L. fuliginosus* nest from Wellington College.

Limosina rufilabris, Stnh. ?—A specimen of a small fly of the genus *Limosina*, which I took in Scotland, is queried as this species, by Mr. Collin. I found it in the galleries, in a nest of *Formica fusca*, among the ants, under a large, heavy stone, at Loch Arber, near Dumfries, on April 30th, last. The ants paid no attention to it. I have bred *L. curtiventris*, Stnh., in numbers from my *L. fuliginosus* nest referred to above.

Limosina fungicola, Hal.—A specimen was taken with *F. rufa*, in

the Hays Wood, near Knowle, in May. I have also bred this species from my *Lasius fuliginosus* nest. Some species of the genus *Limosina* are therefore associated with ants. The larvæ probably feed in decaying vegetable matter and refuse in the nests.

Medeterus truncorum, Stnh.—A specimen was bred out of my *F. rufa* observation nest from Weybridge, in March.

Corynoptera, sp. ?—A species of this genus was taken in the débris of a *Formica rufa* nest, at Weybridge, in May.

Sciara, sp. ?—Several specimens of a small species of this genus were bred out of my *Tetramorium caespitum* nest from Whitsand Bay, in February and April.

Microdon mutabilis, L. (see pl. ii., figs. 1-3).—I am, unfortunately, unable to add much to the knowledge of the habits of the larva of this species. During my absence this summer, my *Formica fusca* nest was first allowed to get too dry, and then watered too much, with the result that the nest was attacked by mould, and the whole of the contents destroyed. As I have now no more material, it is perhaps as well to publish such observations as I have been able to make. On April 18th, 1907, I found a nest of *Formica fusca* under a stone at Porlock. On the underside of the stone was a fullgrown larva of *Microdon mutabilis*, another which had just pupated, and an empty pupa-case. The pupa developed the two little horns which it bears, between April 22nd and 23rd, and hatched on the morning of May 21st. The fly was walking about at 3 p.m., the wings not having developed; by 6.30 p.m. the wings were fully grown. The larva pupated on April 24th, one horn was put out on May 4th, and the other showing on May 5th, but this horn was never fully developed, and the fly never hatched, though its body could be seen inside the pupa-case.

On April 19th, 1907, I found another nest of *F. fusca*, also at Porlock, under a stone; this contained a number of *Microdon* larvæ, on the stone and in the galleries of the nest. I dug up the whole nest with two deälated queens and a lot of workers, and when I got home fixed them all up in a glass bowl half full of sand, in my study. One larva pupated on the side of the bowl on April 24th, and the fly hatched on May 27th. Whenever I lifted up the clump of earth which covered the nest in the bowl, the *Microdon* larvæ were always to be seen in the bare galleries of the nest, among the ants. This I did at various times, from May to December, 1907, and January to June, 1908. Occasionally a larva came up on to the top of the nest, and crawled about, and then returned again. In April, this year, the queens had laid a number of eggs, which the workers used to bring up in the sun. On July 15th and 18th, two *Microdon* larvæ came up and pupated against the glass side of the bowl. At different times I took larvæ out to exhibit (at the Royal Society, and the Conversazione Ent. Soc.), and to be photographed. I also isolated specimens with their hosts in plaster nests. I have written in my note-book, May 7th, 1907: "The ants (*F. fusca*) appeared to gently bite at the larvæ, but not in any way to attack them." I also introduced them to specimens of *F. rufa* and *F. sanguinea*, but these ants appeared not to notice them. I sent a larva this year to Mr. Grosvenor, of the Oxford Museum, to dissect. He writes, "there was no solid food in the forepart of the gut, and very scanty brownish fæcal matter in the

rectum. I think the beast must feed on the soft parts and juices of insects." Wasmann says,* the ants appear to nurse these larvæ as they do their coccids, but, later, he writes† that the larvæ of this species which he had found in a nest of *F. sanguinea-fusca*, at Linz-on-the-Rhine, and had under observation for months, were entirely ignored by the ants. Adlerz suggested‡ that the larvæ of a species of *Microdon* he had found in a nest of *Camponotus herculeanus* in Sweden, subsisted on the moist and tender wood, forming the walls of the ant-galleries in pine-stumps, although they were also found in burrows in the dry bark. He also records that the ants paid no attention to them.

Wheeler writes* of some larvæ of an undetermined species of *Microdon*, seen in a nest of *F. consocians*, at Colebrook, Conn., as follows—"These were found, July 7th, in a single nest, under a large stone, lying on a lot of twigs, grass-roots, etc. Three larvæ were seen at this time, one nearly mature, and one about a quarter grown. On the twigs and lower surface of the stone there were some twenty empty puparia from which the flies had already escaped. The three larvæ were placed in a "Fielde nest" containing several hundred *F. consocians* workers. The two older ones at once applied their flat creeping-soles to the glass bottom of the nest, and with their hard rough backs resisted the attacks of the workers. The small larva was not so successful. The ants turned it over on its back, and for two days kept licking and biting it, till it was killed and reduced to a small granule. The two large larvæ kept crawling slowly about the nest. They raised the anterior end of the body a little distance from the glass surface, and moved the small pointed head, which is just beneath it, from side to side, apparently in search of food. They showed signs of uneasiness when exposed to strong light. They remained in good condition till August 23rd, when one of them disappeared. It had probably been eaten by the ants. The other lived till September 10th. Some days previously it had begun to shrivel, and finally dried up without losing its hold on the glass. I have failed to ascertain the nature of the food of these larvæ. July 25th, I again visited the wild *F. consocians* nest, but found that the ants had moved away. On the twigs there were two more half-grown, but rather emaciated, *Microdon* larvæ, which had been left behind by the ants. The fact that these larvæ were so emaciated, and died soon after they were placed in the same "Fielde nest" with the others, shows that the presence of the ants is in some way essential to the well-being of these singular syncæetes."

We see from the above that *Microdon* larvæ belong to the indifferently-treated lodgers, and that it is necessary for them to live with ants. The question of their food, however, is still unsolved, and I cannot agree with Adlerz that they subsist on wood, as so many species occur in the bare earthen galleries in ants' nests.

ARANEINA.—*Thyreosthenius biolata*, Cambr.—I found this species in nests of *Formica rufa*, at Haye Woods, near Knowle, in May and Nethy Bridge, in September.

* *Kritisches Verzeichniss der myrmekophilen und termitophilen Arthropoden*, 1894, p. 173.

† *Erster Nachtrag zuder Ameisengüsten von Hollandisch Limburg*, 1898, p. 7.

‡ *Myrmecologischer Notiser. Entomol. Teilschrift*, 1896, pp. 131-132.

* *Bull. American Mus. of Nat. Hist.*, 1906, p. 62.

Evansia merens, Cambr.—I found specimens in a nest of *Formica fusca*, at Nethy Bridge, in September.

Micarisma festivus, C.K., was taken in company with *F. fusca*, in the New Forest, in May, as was also *Harpactes hombergi*, Sep.

Diblemma donisthorpei, Cambr.—This little species was described* from specimens taken by me at Kew Gardens, with the little ant *Wasmannia auropunctata*, to which it bears a strong superficial resemblance. I found it in some numbers in February and March.

Salticus formicarius, Walt.—I took a ♂ and two ♀s of this very ant-like spider, running about in company with *Myrmica scabrinodis*, at the roots of *Lotus major*, at Sandown, Isle of Wight in August. Father Wasmann records it in the neighbourhood of *F. rufa*, *F. rufibarbis*, and *Myrmica laevinodis*, in Holland.

ACARINA.—*Laelaps myrmecophilus*, Berl.—I found this species in April at Dartmouth, with *Myrmica ruginodis*.

Laelaps cuneifer, Mic.—I took this species this year with *Formica rufa*, at Knowle in May, and *F. fusca* at Bewdley in May, and with *F. sanguinea* at Woking, in July. Berlese† records it over the whole of Europe, and in America, with many different species of ants.

Uroplitella minutissima, Berl.—I found this little species in some numbers in nests of *Lasius niger* at Kingswear, in April.

Trachyropoda coccinea var. *sinuata*, Berl.—I took this variety, which is new to Britain, in plenty, in company with the last species, in nests of *Lasius niger* at Kingswear, in April.

Sphaerolaelaps holothyroides, Leonardi.—I took a specimen of this mite, which is here recorded for the first time in Britain, in a nest of *Lasius umbratus* at Bewdley, in May. The mite is the same colour as the ant, and, when it moved, it looked like the abdomen of an ant walking about by itself. Berlese records it with *Lasius affinis*, *L. umbratus*, *L. flavus*, and *Pheidole pallidula*. My friend, Dr. Joy, tells me he used to see this species at Wellington College, with *Lasius umbratus*.

COCCIDÆ.—*Ripersia subterranea*, Newst.—I took this species in some numbers in a nest of *Lasius niger* under a large stone at the mouth of the Dart, near Dartmouth, last April. It has only been taken in Britain before at Ingoldisthorpe, near King's Lynn, by Mr. Newstead, with *L. flavus*, and with the same ant near Edinburgh, by Mr. W. Evans. I have to thank my friend Mr. E. Green for the name of this species.

EXPLANATION OF PLATE II.

Fig. 1.—Imago of *Microdon mutabilis*.

Fig. 2.—Pupa of *Microdon mutabilis*.

Fig. 3.—Larva of *Microdon mutabilis*.

NOTES ON COLLECTING, Etc.

PAIRING-HABIT OF *PETASIA CASSINEA*.—On October 31st, 1908, I observed two *Petasia cassinea* sitting on a gate-post in copulâ, in Ashton Wold, where the species is common. As I approached they fell to the ground, where they remained on their backs feigning death. Has this habit been noticed before?—N. CHARLES ROTHSCHILD, F.E.S., 5 and 6, Chelsea Court, Chelsea Embankment. November 25th, 1908.

HYBERNATION OF *PYRAMEIS ATALANTA*.—With regard to the hyber-

* *Proc. Dorset. Nat. Hist. and A. F. Club*, vol. xxix., 1908.

† *Redia*, vol. i., p. 416.